Chapter 8 COMMUNICATION / NAVIGATION

A. INTRODUCTION

1. Communication and navigation skills are required for those Auxiliarists qualifying as air crew or observers and this qualification mandates a detailed knowledge of these skills. These communications skills fall into two categories, electronic and visual. Navigational skills require the use of electronics as well as the ability to read sectionals and marine charts.

B. RADIO COMMUNICATIONS

1. The primary purpose of Auxiliary aviation is to act as the eyes for Coast Guard and Coast Guard Auxiliary operations and transmit the information gathered to shore or other operating facilities. With the exception of ATON missions this is done primarily by radio, therefore the ability and competency of all involved in using the radio is of utmost importance. The factors involved are: The radio, its installation, antenna system, and the operators skill in using the radio with proper and effective radio technique.

2. A typical Auxiliary aircraft on a safety patrol, environmental flight or SAR response will maintain communications with an FAA facility and with regular Coast Guard and/or Coast Guard Auxiliary units. These may be Coast Guard cutters, small boats, aircraft, or ground radio stations, on frequencies ranging from high frequency single side band to UHF. A qualified and competent air crew or observer can assist the Auxiliary pilot by handling some of these communications directly and by recording pertinent information obtained through these radio contacts.

3. Pilots may prefer to personally handle communications relating to air traffic control since actions required must be correct and immediate. These include communications with airport ground control, clearance delivery, control tower instructions, FAA flight service stations, air route traffic control centers (ARTCC), and approach control, which provide separation from other aircraft. Some of these communications will contain information that will be needed later by the pilot. The air crew/observer should be ready to record these instructions when requested by the pilot. Air crew/observers will soon learn to anticipate which data requires recording.

4. The PIC is responsible for all aspects of a flight including the radio transmissions from the aircraft. When in doubt, the air crew/observer must obtain approval from the pilot before making a transmission.

C. COMMUNICATIONS EQUIPMENT

1. Aircraft Band: One or more radio transceivers (VHF-AM) operating in the frequency range of 118.000 to 135.975 MHz are common in aircraft flown by Auxiliarists. They are compact and designed to fit in industry standard racks in the instrument panel. These transceivers are operated in the same manner as radios aboard vessel facilities. There is an off/on-volume control, a squelch control, which is used to minimize background noise, and a frequency selector, which displays the frequency digitally. If there is more than one aircraft radio, there will generally be a selector switch that selects which radio is to be used for transmission. It is possible to have two radios on at one time and you can listen to both at the same time. However, you must be extremely careful before transmitting. Make sure that you have selected the proper radio frequency.

2. Aircraft frequencies: The following are aircraft frequencies that you should know:

   a. **121.50** - Distress emergency communications only

   b. **122.750/122.850** – Air to Air

   c. **126.20** - Military airports

   d. **122.00** - Flight Watch/Flight Service Station

   e. **123.10** - SAR frequency, search and rescue, air to air

3. Marine Band: One or more radio transceivers (VHF-FM) operating in the frequency range of 156.050 to 162.025 MHz. Most VHF-FM marine band transceivers used in Auxiliary aircraft are not designed to fit in the standard aircraft stack. These essential radios are usually mounted below the panel or wherever space permits their safe mounting. Often, due to a mismatch of microphone impedance, the marine band radio cannot be interconnected with the aircraft microphone system, thus requiring a separate microphone. A less desirable, but more common, method to obtain marine band communications is to use a portable unit attached to an external antenna.

4. The installation should be of a base type radio using the aircraft electrical and intercom system. The antenna should be hull mounted to the bottom of the aircraft for best results and dedicated exclusively to the VHF/FM radio. It may have a "Y" lead for emergency use of a suitable hand held VHF/FM unit. It is important that all on board to be able to hear the communications on the VHF/FM in order to assure good CRM principles and reduce time and error in passing along information within the aircraft.

5. When used in these manners the microphone will pick up aircraft noise. Communications will be difficult. Try to use an earphone instead of holding the portable to your ear. Use an attached microphone.

6. Marine frequencies: The following are marine band frequencies you should know.

   a. **Channel 16** International calling and distress

   b. **Channel 21** Coast Guard working frequency

   c. **Channel 22** Communications between vessels and Coast Guard stations

   d. **Channel 23** Coast Guard working frequency

   e. **Channel 81** Coast Guard working frequency

   f. **Channel 83** Coast Guard working frequency (also used in Canada)

7. Due to the increased range possible with VHF/FM radios transmitting from aircraft, low power should be used when possible. Aircraft may not transmit on any VHF/FM maritime frequency when operating above 3000 feet mean sea level or mean Great Lakes level.

D. RADIO PROCEDURES

1. Before you broadcast:

   a. LISTEN - Be sure that no one else is using the frequency.

   b. THINK - Plan what you are going to say. Brevity is important.

   c. PREPARE - Know where you are. Anticipate questions you may be asked to answer. Know what frequency you are listening on.

2. Specifics: There are certain procedures and phraseologies that are peculiar to air operations. air crew/observers should practice these until they become second nature. Practice not only improves communications but also tends to overcome shyness or mike fright. Study the following samples of typical radio calls from an aircraft: (your aircraft is N314TM)

3. Initial call to a Coast Guard facility:

   NOTE - The first call uses ALL of your call sign, Coast Guard Auxiliary Three One Four Tango Mike. Subsequent calls use the last three digits and/or letters 4 Tango Mike.

   "Coast Guard Group Charleston, Coast Guard Group Charleston, Coast Guard Group Charleston, this is Coast Guard Auxiliary Aircraft Three One Four Tango Mike, over."

   NOTE - The station identifier should be repeated 3 times on the first call.

After communications is established the call before the body of each transmission may be abbreviated to the name of the unit or the last three digits/letters of the call sign:

Example: "Seven Two Romeo, this is Four Tango Mike, what is your location? Over."

Example: "Seven Two Romeo, this is Four Tango Mike, say your ETA on scene. Over."

4. Air frequencies: When you are required to initiate calls on aeronautical frequencies, it is important to note some additional differences in phraseology and procedure. Although the rules concerning aircraft call signs remain the same on initial contact, it is necessary to include the make or model of the aircraft. This allows the aircraft controller to better identify your aircraft when pointing you out as traffic to other aircraft. It also gives the controller an idea as to your operational capabilities.

   NOTE – When flying under orders you are a Coast Guard facility and you can use the call sign Coast Guard or Coast Guard Auxiliary your flight plan designation is changed from an N to a C (Chapter 13.D.2).

   Examples:

   "Miami tower, Coast Guard 314TM, over"
   (Response from tower ----)
   "We are a Cessna 172 at" ----(give altitude)

   If you do not use your Coast Guard designation first:

   "Miami approach, this is Bonanza niner niner xray, over."
   (Response from approach)
   "We are a Coast Guard Auxiliary aircraft" ---- (give location and your request)

   After the facility knows what kind of aircraft you are and if you are on a SAR flight:

   "Republic tower, this is Rescue three one four tango mike, over."

5. When engaged in SAR operations you may use the prefix RESCUE.

6. Designations for aeronautical stations:

   a. Air route traffic control centers: "Memphis Center"

   b. Approach control: "Boston Approach"

c. Airport tower: "Baton Rouge Tower"

d. Airport ground control: "Jacksonville Ground"

e. Pre-taxi clearance control: "Kennedy Clearance"

f. Flight Service Stations: "Portland Radio"

g. Enroute Flight Advisory Service: "Oakland Flight Watch"

7. Additional procedures to remember:

   Time - Use the 24-hour clock and say each digit separately.

   Example: 0825; zero eight two five

   When reporting altitudes state separate digits for the thousands, plus hundreds, if appropriate.

   Example: 4500 ft - four thousand five hundred; or, 10,000 ft - one zero thousand

   When giving a heading or direction, use three digits.
   Example: 050 degrees - heading zero five zero; or due North heading zero zero zero

   Give speed in knots.

   Example: 120 knots - one two zero knots.

8. When you are "handed off" from one air traffic controller to another, always include your altitude when making the initial contact. Example: "Mobile Approach, this is three one four tango mike at seven thousand."

9. Avoid calling Flight Service at 15 minutes past the hour. This is when they are transmitting the regularly scheduled weather broadcasts.

10. Short counts and long counts.

    Short Count: When a short transmission is required for receiver tuning or direction finding a "short count" is used. This consists of counting from one to five and back. The transmission should not exceed ten seconds.

    Long Count: When a longer transmission is required, a long count is employed. This consists of counting from one to nine and back.

11. Communications to the Coast Guard on marine frequencies.

a. Departure: Immediately after takeoff communications should be established with an Auxiliary or regular Coast Guard station and a flight guard should be established. At least the following information should be transmitted:

(1) Time of takeoff.

(2) Departure airport.

(3) Number of persons on board.

(4) Mission and/or destination.

Example: "Coast Guard Activities New York this is Coast Guard Auxiliary aircraft three one four tango mike, over."

After response from New York

"We were airborne from Linden at fourteen hundred with 3 persons on board for a coastal safety patrol. Request you take our radio guard. Over."

12. In-flight reporting.

a. Operations normal: Or "ops normal" reports should be made every 15 minutes. Times given by aircraft in informal radio traffic are expressed in minutes after the hour with the hour itself not being given unless necessary. This is done because aircraft often cross several time zones is a relatively short period of time. The "ops normal" report should include:

Flight status "ops normal"
Position - to the nearest minute of latitude/longitude or a known landmark.
Heading

Example: "Coast Guard Group Charleston, this is Coast Guard Auxiliary aircraft three one four Tango Mike; flight operations normal; position 32 degrees 34.1 North, 80 degrees 00.8 West; heading two seven zero degrees. Over."

b. Changing flight guard stations: When changing your flight guard from one station to another, first establish your guard with the new station then secure your guard with the previous station advising them of the identity of the new guard station.

Example: "Coast Guard Station Tybee, this is Coast Guard Auxiliary aircraft three one four tango mike. I have established my radio guard with Coast Guard Group Charleston. I request you secure my guard. Over."

c. End of mission: At the end of the mission the Coast Guard Air Station you are flying the mission for must be informed that the aircraft is back on the ground and the mission has been completed.

13. Relaying traffic: Because an aircraft presents such an ideal antenna due to its altitude, you may be the only unit capable of communicating with the vessels or aircraft at the scene of a mission. If you are asked to relay information between the shore station and the units on scene it is imperative that the information be retransmitted exactly as it is received. Under no circumstances, inject any subjective interpretation to the information being relayed.

E. RADIO COMMUNICATIONS IN SAR SITUATIONS

1. While performing a SAR mission the crew member acting as radio operator of the VHF/FM radio should be experienced in communication with shore stations and understand the demands and requirements of the land based watch stander. The station or group watch stander is often confronted with multiple tasks and more than one radio to deal with at a time. When you first make contact always identify the frequency you are transmitting on and give a full call sign for your aircraft.

   Example: "Station Brunswick, Station Brunswick, Station Brunswick this is Coast Guard Auxiliary aircraft 66N on Channel 16 Foxtrot Mike"

2. This way the watch stander will know which radio unit the call is coming in on. Be prepared to switch to the "working frequency" which the station gives you or to a predetermined frequency. Be sure to abbreviate your call sign to something like the following, the longer the call sign you use the more difficult it is for the watch stander to understand.

   Example: "Coast Guard 66N switching to 83 Alpha"

3. Have a specific understanding of which frequency you will be operating on between "ops normal" or other regularly scheduled contacts and guard it. If you are working a case see if all communications can't be on one frequency, and if not use the technical ability of your radio to guard the pre-arranged "on call" frequency while you also listen on the frequency being worked by the case assets.

4. For example you have established guard and are on call back on FM Channel 16. However, the other air assets are working FM Channel 22A. You will listen to 22A and monitor 16. When you call in for a routine "ops normal" say that on first contact so the watch stander knows what piece of paper to pull out and what he or she can expect to hear.

Example: "Station Brunswick, this is Coast Guard 66N on Foxtrot Mike 16 with ops normal report."

5. If you don't think the watch stander at the station you are contacting understood your intended message ask for confirmation. Don't fly around for several minutes and then have to call them back to see why you didn't get the response you expected. The golden rule of communication is to listen. If you have a problem hearing the radio, turn it up. Others in the aircraft should not be talking on the intercom system with incoming VHF/FM traffic. Most intercom systems will squelch out the auxiliary radio in favor of the intercom traffic. Use the mike button properly. Press to talk and hold the mike key for a half-second before you talk. After you are finished talking hold the mike key for another half-second. The FM radio has a "capture effect", the strongest signal will lock the receiver to it. You need to capture the receiver before you start sending your message and hold for a brief period to assure completion. If you are working a case with other assets and you are having difficulty maintain guard because of radio reception remember you do have 25 watts available. If that is not effective you may use a suitable surface facility within 25 miles or closer to your position as a communications guard station

6. Speak directly into the microphone with it almost against your lips. Engine and wind noise will cover most of your message if you do not. When you speak do so in a firm voice but do not overload the radios front end by shouting, it won't make the message go any further but it will distort it. If you spend some time on land or on a boat listening to radio traffic you will become aware of the good and bad techniques employed by various parties. Become familiar with the phraseology and information sequencing used by Coast Guard land stations and operating facilities. That is what they will expect to hear from you and will be comfortable with when you communicate with them.

F. VISUAL COMMUNICATIONS

1. Communications, of some sort, between an assisting Auxiliary aircraft facility and surface units are necessary if the aircraft giving assistance is to be effective. The communication may be with the vessel being assisted, an assisting surface vessel, or both. The communication may consist of simple aircraft and surface maneuvers, surface manual signals, radio, or a combination of techniques. Regardless of the methods used, your aircraft will be of little value if some sort of workable communications between the surface vessel and the aircraft cannot be established. In the case of a surface vessel being assisted, the personnel on board may have little or no knowledge of how to communicate with the aircraft. Therefore, considerable ingenuity and patience on the part of the aircrew may be necessary to establish a degree of effective communication.

2. Very often, only visual methods will be available for communications with vessels on the surface. This is particularly true during a patrol or search where the surface vessel is attempting to pass the message that it needs assistance. Aircrews should be alert to a variety of possible signals from the people on the surface to help in this identification, including:

   a. Body signals where one of the crewmembers of the unit in need of assistance faces in the direction of the aircraft and raises and lowers his arms or more probably, waves madly.

   b. Use of a circle and square signal on a hoist, or a black square and black circle on a flag with an orange background (see figure 8.1).

Fig. 8.1 Signal Flags

Square Flag and Ball

Distress Flag

Bright Red-Orange Background with Black Ball & Square

   c. Smoke or fire from a surface vessel. It may be from burning oil or oily rags in a can and can be detected from a considerable distance (see figure 8.2).

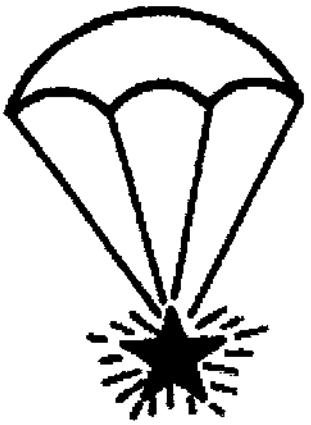
Fig. 8.2 Signal Fires or Smoke

Smoke

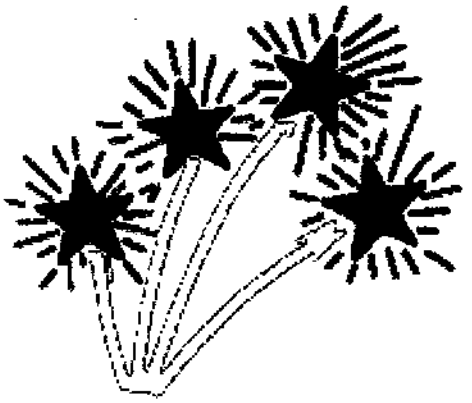
Flames on a Vessel

d. Pyrotechnics. Flares and meteors from the surface as well as smoke (see figure 8.3).

Fig. 8.3 Pyrotechnics



Parachute Red Flare



Red Star Shells

e. Dye marker on the water (see figure 8.4).

Fig. 8.4 Dye Markers

Dye Marker
(Any Color)

3. Another need for visual communication may arise when the aircraft has the need to direct a surface vessel. This may occur when the aircraft is attempting to guide a

surface vessel away from danger or to assist another vessel. In 1953, the Treasury Department originally produced form CG-3488. Figure 8.5 illustrates the Aircraft Emergency Procedure for Attracting Surface Craft. It may be used as the basis of non-verbal communications with surface vessels. The Coast Guard and the Coast Guard Auxiliary have been providing copies of the CG-3488 to boat operators for many years. Thus, Auxiliarists can be expected to understand the maneuvers, and many members of the boating public will recognize them. In any event, they will probably be understood even if the surface vessel crew has not been exposed to the CG-3488 although repetition may be necessary (see figure 8.5). You might want to distribute this at boating classes or marinas.

a. To initiate this request for assistance, the surface vessel is circled at least once. Additional circling may be necessary to obtain the attention of the surface crew. This can be verified when members of the surface crew are observed to be watching the maneuvers of the aircraft.

b. After circling the vessel at least once, the aircraft is flown across (perpendicular to) the vessel's projected course while opening and closing the throttle, rocking the wings or cycling the propeller pitch. Next, the aircraft is flown outbound in the direction that the surface vessel is to take. If the surface vessel does not respond, the procedure should be repeated.

c. The surface vessel should also be observed for signals indicating that he cannot or will not accept the directions. Be alert for other signals such as a wave-off or the surface to air signal for "negative."

d. Another possible signal for a vessel to indicate "no" when underway might be to swing the bow of the vessel left and right in the manner of the aircraft maneuver of "negative". Obviously, if the surface vessel displays no reaction or response to repeated attempts to signal him, this should be accepted as tacit refusal of the directions, and other available means of obtaining the desired action should be pursued.

e. When a surface vessel does accept the directions, he will do so by picking up the desired heading. As the aircraft will be traveling at a much higher speed, it can circle back to the vessel periodically and pass him close by while flying in the direction of the desired course. This technique can be used to verify that the correct course is being followed and/or for indicating corrections in the course for the surface vessel. When the target seems to be in visual range of the assisting vessel, the aircraft then circles the target to serve as reference to the surface vessel. This same technique can be used to steer a vessel around an unseen hazard. The aircraft should circle at waypoints until the vessel arrives then indicate a new course.

f. If the conditions change during the operation, the vessel is free from danger, or other reasons develop so that the aircraft no longer desires the surface vessel to follow the course indicated. The aircraft should be flown close astern of the

surface vessel at low altitude while changing the engine sound (by throttle or prop control) or rocking the wings until the vessel indicates understanding of the cancellation. The aircraft is then free to break contact.

Fig. 8.5 Aircraft Emergency Procedures for Attracting Surface Craft

Aircraft Emergency Procedures for Attracting Surface Craft

The Following Procedures Performed in Sequence are Employed by Aircraft to Direct a Surface Craft Towards an Aircraft or Surface Craft in Distress.

1) Circling the surface craft at least once.
2) Crossing the projected course of the vessel close ahead at a low altitude, rocking the wings or opening and closing the throttle or changing the propeller pitch.
3) Heading in the direction in which the surface craft is to be directed.
4) Repeating if necessary.

When assistance of the surface craft to which the signal is directed is no longer required, aircraft performs following procedure.

1) Crossing the wake of the vessel close astern at a low altitude, rocking the wings or opening and closing the throttle or changing the propeller pitch.

Normally a change of heading will be made by the surface craft as an acknowledgement that the direction has been received and will be complied with. If the surface craft is unable to comply it will so indicate by hoisting the international flag "N" or by other visual or radio means.

****** To be posted at Conning Station******

Dept. of Transportation., USCG, CG-3488 (Rev. 2-75) GPO 956-450

4. Message Drops: Message drops are used for communication with surface craft or persons in distress. Aircraft must be certified in writing by the cognizant district commander before deployment of any SAR device such as a drop message. Aircrews so certified must practice regularly to maintain proficiency and accuracy in deploying message drops or any other SAR device.

5. Body Movement Signals: A somewhat more involved and more flexible method of surface-air communication is the visual body signals system. These signals, which were developed for military use are now widely accepted in the civilian community and are found in various aircraft and SAR documents including the Airman's Information Manual, the AOPA Handbook For Pilots, and the Search and Rescue (AUXSAR) Student Text.

6. There are eleven such "standard" signals that can be made by a person aboard a surface vessel, but only eight of these have utility in the typical Auxiliary aircraft area of operations. (Figure 8.6) The signals are simple body position and movement signals and are taught in various Auxiliary training courses. Most often, the signals will be used by an Auxiliary surface facility. However, members of the general boating public may have received instructions in their use or may have a document available, which describes the signals and explains their use.

7. When teaching boating classes, it is advisable to include the various types of visual messages as well as distress signals in the curriculum.

Fig. 8.6 Body Movement Signals.

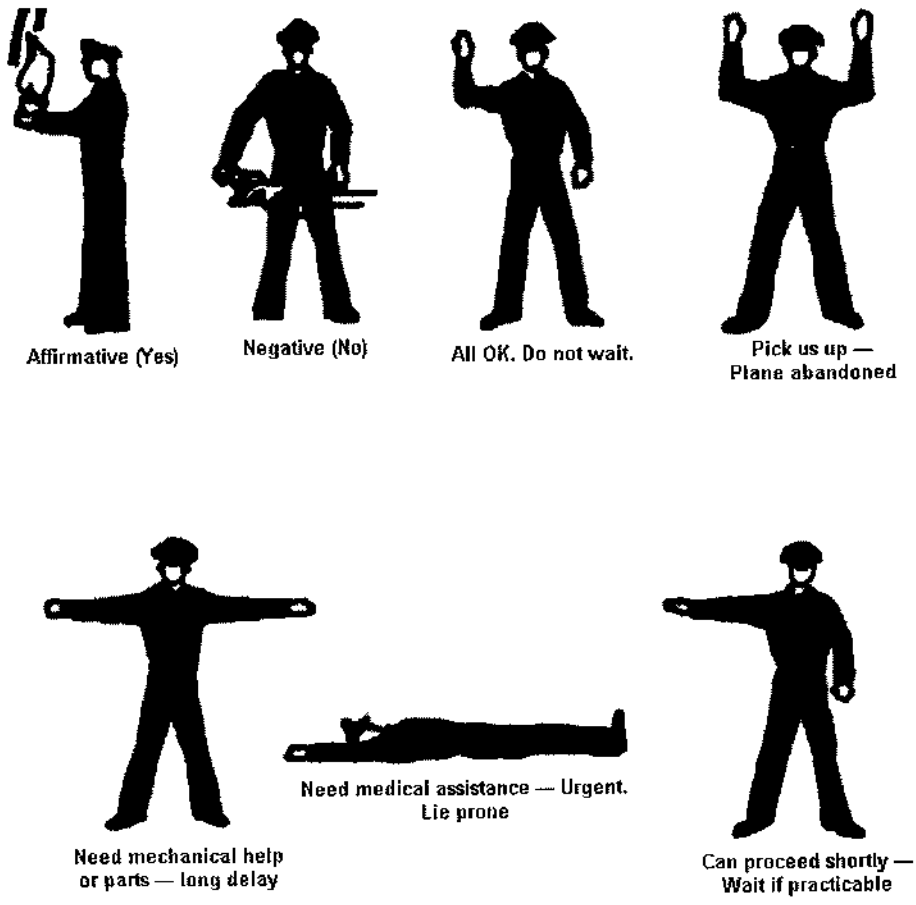
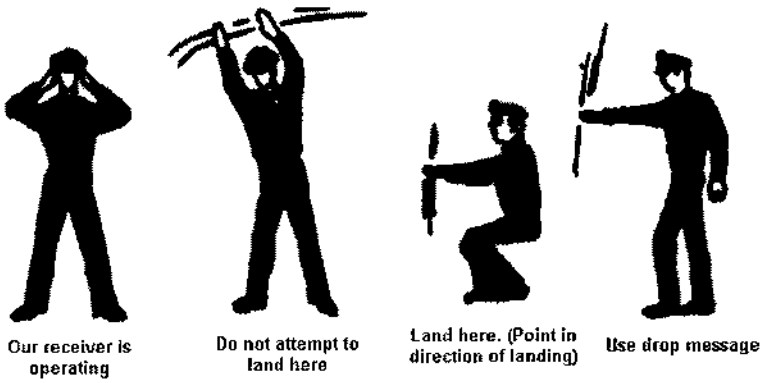
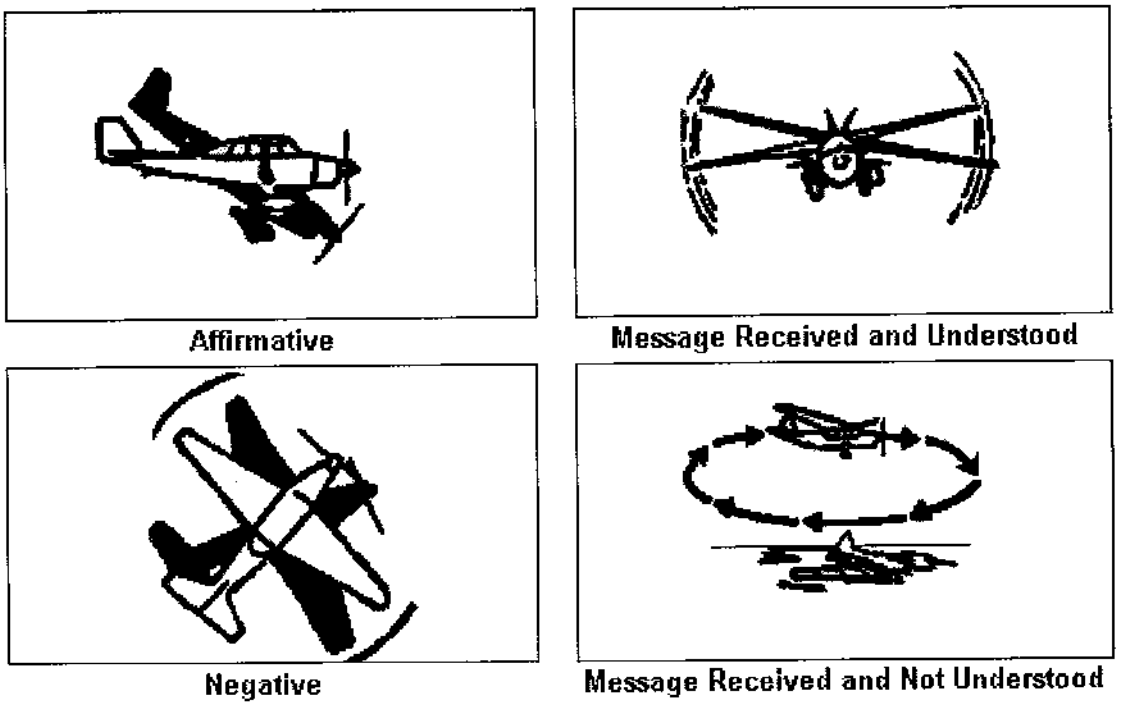


Fig. 8.6 Body Movement Signals cont.



8. The aircraft acknowledgment signals shown in Figure 8.7 are used to respond to the visual body signals. These signals are straightforward and simple in their application. The signals used for "message received and understood," "affirmative" and "negative", should be performed smoothly and slowly. Care must be taken in making the signal for "negative" to avoid a skid at slow speed, which could develop into a violent stall. The signal can be performed as a series of shallow turns rather than "yawing" the aircraft, thereby avoiding the skid danger.

Fig. 8.7 Aircraft Acknowledgement Signals.

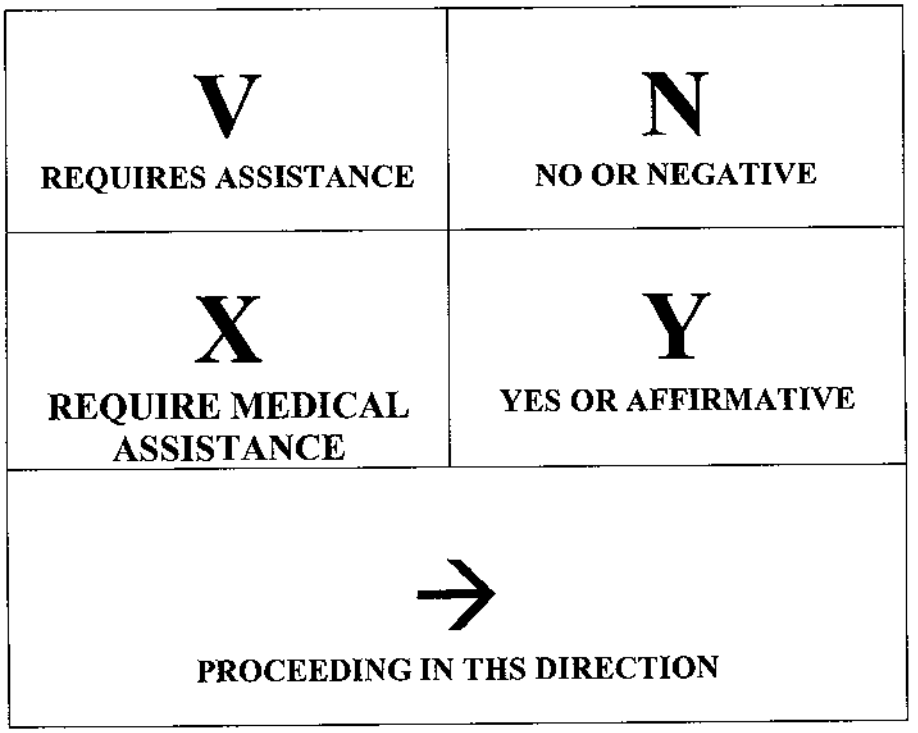


9. Ground Emergency Symbols: There are recognized emergency communication symbols designed to be used by survivors ashore to impart information to aircraft. These are international symbols and can be found in various publications. Caution should be exercised due to the fact that the accepted symbols were reduced in 1981 by international agreement from eighteen to only five. Many publications are likely to carry the out of date symbols. It is also likely that those who have access to the out of date publications will use the older symbols. The new ground-air symbols are in Figure 8.8.

10. Using strips of fabric, wood, stones or any material contrasting with the background surface may make the signals. They may also be marked out in snow or on the ground or in sand. Pilots receiving such signals should acknowledge them by rocking the wings of the aircraft.

11. Identifying Auxiliary Vessels: Regular Coast Guard vessels are easily identified by their distinctive hull markings or by their blue light. Auxiliary vessels, for the most part, resemble other private vessels. From the air, such identifying markings as ensigns, patrol boards names, and numbers may provide some help. In addition, the uniforms worn by the Auxiliarists will be distinct. The advent of the flashing amber and red "public service vessel" light will be some help however a more distinctive signal is to have the Auxiliary vessel turn in a tight circle. The circular wake is readily identified from the air. Positive identification of an Auxiliary vessel may be important when providing directions toward a disabled vessel or distress location.

Fig. 8.8 Ground Emergency Signals



G. NAVIGATION EQUIPMENT

1. The air crew/observer qualified Auxiliarist is required to learn how to understand, operate and interpret the navigational equipment discussed in this section. Proficiency will come only after repeated exposure and hands-on training.

2. VHF Omni-Directional Range (VOR) navigation receivers operate in the frequency range of 108.000 MHz to 117.950 MHz and receive signals from ground VOR stations. These signals provide azimuth information to the aircraft. This information is displayed as the magnetic bearing either to or from the VOR station. The term used to describe the azimuth information is the "radial" from the station. This is the magnetic bearing from the station. If the aircraft were on the 140 radial of the Harvey VOR, the magnetic bearing from the HARVEY VOR to the aircraft would be 140 degrees. If the aircraft were to fly to the station, it would fly a 320-degree heading (the reciprocal of 140 degrees).

   a. VOR's are equipped to transmit some form of audio signal (Morse code or recorded voice) that is used to verify that you have tuned in to the correct station.

   b. VOR/TACAN (VORTAC) or VOR/DME stations have the additional ability to provide the distance in nautical miles between the aircraft and the station. The equipment used for this function is called DME (distance measuring equipment). The VOR, VORTAC and VOR/DME signals are line of sight instruments and are not seriously affected by atmospheric conditions. The computers within the typical navigation receivers will display range and bearing to/from the station and, in the case of a VORTAC or VOR/DME, will display the range, ground speed and time to the transmitting station.

3. Another navigation receiver sometimes found in Auxiliary aircraft is the automatic direction finder (ADF). This receiver can be tuned to frequencies from 200 to 415 kHz for low frequency radio beacons and from 535 to 1605 kHz to cover the standard AM broadcast band. When tuned to a station, the needle of the indicator will point toward the transmitting station. This may be displayed either as a bearing relative to the heading of the aircraft or as a magnetic bearing from the aircraft to the station. These beacons are subject to errors caused by various kinds of disturbances. They also transmit a three-letter identification code except during voice transmissions.

4. The Long Range Aid to Navigation (LORAN) receiver uses a network of land-based radio transmitters. Before it can provide accurate navigational information, it must acquire signals from three or more stations. The computer will display the aircraft's position in latitude/longitude coordinates. Most LORAN units have the capability to store a number of positions as waypoints and may display range and bearing, ground speed, cross-track error, and other information relative to these waypoints and the aircraft's position. LORAN does not depend on line of sight

signals. LORAN databases also store information about airports. These databases must be updated every 60 days.

5. Global positioning system or GPS depends on information received from satellites. The GPS computer displays the aircraft's position in latitude/longitude as well as altitude. The information available to the pilot is much the same as that given by LORAN. Some of the GPS units are equipped with 'moving maps' which constantly show and update the position of the aircraft.

H. USE OF NAVIGATION EQUIPMENT FOR SAR

1. As stated before, the VOR system is basically line of sight therefore the aircraft's effective range in using this system increases with altitude. The effective range for the VOR portion (azimuth) is greater than that for the DME (range). Either a line of position (radial) from two VOR stations or one line of position and distance from a VORTAC or VOR/DME station may determine a position fix. This information is then plotted on an aeronautical chart and converted to latitude/longitude, if required. This allows the position to be plotted on a nautical chart for use by rescue vessels.

2. LORAN/GPS: A position determined by a LORAN or GPS navigation computer is normally displayed in latitude and longitude and may be passed directly to a vessel or shore station with no correction, adjustment, or other processing necessary. As you fly over a significant target, merely enter your position as a waypoint. Recalling this waypoint will display the position and the LORAN or GPS will provide navigation directions relative to that position. Returning to the position, vectoring a surface craft to the position, or orienting a search about the position becomes simple.